Docket No.: 241538US3X

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

RE: Application Serial No.: 10/645,543
Applicants: Fumio KINOSHITA, et al.
Filing Date: August 22, 2003
For: CONTINUOUS UNDERGROUND TRENCH
EXCAVATING METHOD AND EXCAVATOR
THEREFOR
Group Art Unit: 3671
Examiner: BATSON, V.

SIR:

Attached hereto for filing are the following papers:

## SUPPLEMENTAL RESPONSE

Our check in the amount of **$0.00** is attached covering any required fees. In the event any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 C.F.R 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 15-0030. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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## IN THE UNITED STATES PATENT & TRADEMARK OFFICE

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| IN RE APPLICATION OF | : |
| FUMIO KINOSHITA, ET AL. | : EXAMINER: BATSON, V. |
| SERIAL NO: 10/645,543 | : |
| FILED: AUGUST 22, 2003 | : GROUP ART UNIT: 3671 |
| FOR: CONTINUOUS UNDERGROUND TRENCH EXCAVATING METHOD AND EXCAVATOR THEREFOR | : |

### SUPPLEMENTAL RESPONSE

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

In response to the Office Action dated February 22, 2005 and the notice of non-responsiveness dated Jul 11, 2005, Applicants respond as follows:

The Examiner had objected to the specification because equations 2 and 3 allegedly reduce to $F_z=0$. Applicants replied in the response of April 22, 2005 that equation 2 is directed to the penetration resistance during penetration operation whereas the value of the frictional resistance Ffz in equation 3 is calculated by operating the lift cylinders in an unloaded (unlanded) floating state (page 9, lines 7-10).

According to the notice of non-responsiveness, if equation 3 represents resistance when the trencher is floating in the air, why does the cutter post volume or the liquid specific gravity $\gamma$ around the cutter post affect frictional resistance. In reply, Applicants note that while equation 3 refers to the excavator being in an "unlanded, floating state in the air," this does not require that it be out of the environment of the trench.

Even when bottom end of a cutter post is away from the bottom of underground, the bottom end of the cutter post exists among mixture of water and excavated soil and so floating force is always given to the cutter post. The mixture has a specific gravity of 1.4 - 2,0 generally. The liquid mixture is set for the purpose of preventing the excavated soil from falling apart.

The former question that a value of Fz comes to "zero" (Fz = 0) when Equation (3) is incorporated into Equation (2):

The values of Fud are different from each other in equations 2 and 3 since there is difference between the situation considered under Equation (2) and the situation under Equation (3). Generally, Fud3 (as described below) is larger than Fud2(Fud3 > Fud2) since Fud3 has to support a force given to the bottom end of the cutter post.

In a case that the bottom end of the cutter post is penetrated into the ground and penetration resistance Fz >0 (namely, in a situation of Equation (2))
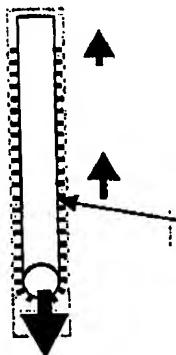
Ffz[kN]: a frictional resistance in a vertically downward direction

$\gamma$V[kN]: floating force given to the cutter post among the liquid mixture under the ground

Fud2[kN]: a lift cylinder load (reactive force from the lift cylinder)

The cutter post exists among mixture of water and excavated soil.

Fz[kN]: penetration resistance against the soil surface of the underground

Floating force is given to the post

W[kN]: cutter post weight (mass)

In a case that the bottom end of the cutter post is penetrated into the ground and the bottom end of a cutter post is away from the bottom of underground (the soil surface of the underground) and that the penetration resistance Fz=0 (namely, in a situation of Equation (3)

$$Ffz = W - Fud3 - YV \qquad . \qquad . \qquad . \qquad (3)$$

(When the post is stopped, Ffz comes to "zero" (Ffz = 0) )

Ffz[kN]: a frictional resistance in a vertically downward direction

$\gamma$V[kN]: floating force given to the cutter post among the liquid mixture under the ground

Fud3[kN]: a lift cylinder load (reactive force from the lift cylinder)

The cutter post exists among mixture of water and excavated soil.

W[kN]: cutter post weight (mass)

Floating force is given to the post
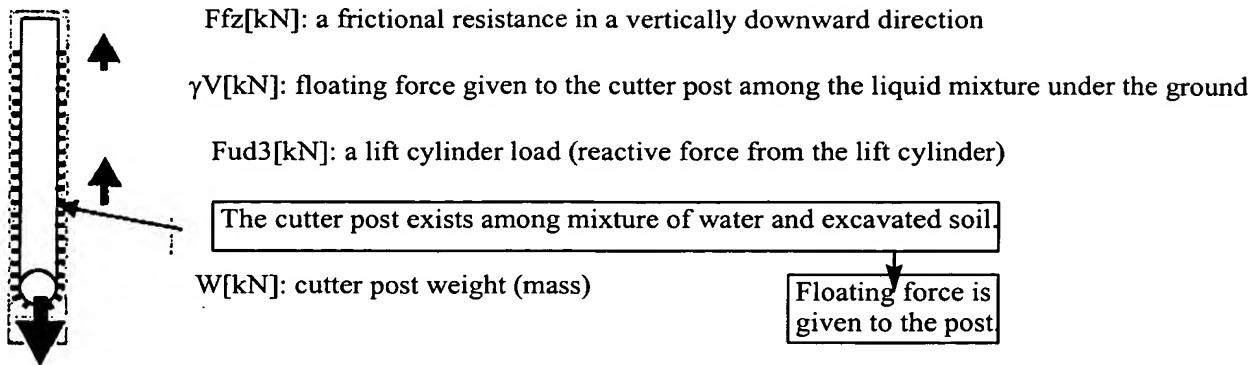
Applicants believe that the present application is in a condition for allowance and respectfully solicit an early notice of allowability.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon
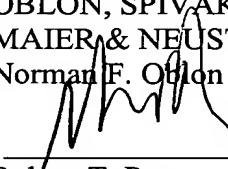
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